CLAIMS

What is claimed is:

1. A method to manage addresses in a network, comprising:

when connecting a mobile router (MR) of a mobile network (MONET) to an access point (AP) of an access network (AN) that includes an Access Router (AR), sending a first neighbor advertisement from a mobile network node (MNN), the first neighbor advertisement comprising a care of address (CoA) and a link layer address (LLA) of the MNN within the MONET;

based on the first neighbor advertisement, constructing a first neighbor cache in the MR that associates the CoA with the LLA;

sending a second neighbor advertisement from the MR to the AN on behalf of the MNN, the second neighbor advertisement comprising a mapping between the CoA of the MNN and a LLA of the MR (LLA_MR); and

based on the second neighbor advertisement, constructing a second neighbor cache in the AR that associates the CoA with the LLA_MR.

2. A method as in claim 1, further comprising:

in response to an arrival of a downlink packet at the AR having a CoA in a destination address field, checking the second neighbor cache using the CoA to obtain the associated LLA_MR of the MR;

transmitting the packet to the MR using the LLA_MR in a link layer destination address field;

in response to the arrival of the packet at the MR, checking the first neighbor cache using the CoA in an IP layer destination address field to obtain the associated LLA of the MNN; and

transmitting the packet to the MNN using the obtained LLA in the link layer destination address field.

3. A method to manage addresses in a network, comprising:

when connecting a mobile router (MR) of a mobile network (MONET) to an access point (AP) of an access network (AN) that includes an Access Router (AR), sending a first neighbor advertisement from a mobile network node (MNN), the first neighbor advertisement comprising a care of address (CoA) and a link layer address (LLA) of the MNN within the MONET;

based on the first neighbor advertisement, constructing a first neighbor cache in the MR that associates the CoA with the LLA, and constructing a mapping table that associates the CoA with one of a set of LLAs of the MR (LLA_MRi);

sending a second neighbor advertisement from the MR to the AN on behalf of the MNN, the second neighbor advertisement comprising a mapping between the CoA of the MNN and the LLA_MRi; and

based on the second neighbor advertisement, constructing a second neighbor cache in the AR that associates the CoA with the LLA_MRi.

4. A method as in claim 3, further comprising:

in response to an arrival of a downlink packet at the AR having a CoA in a destination address field, checking the second neighbor cache using the CoA to obtain the associated LLA_MRi of the MR;

transmitting the packet to the MR using the LLA_MRi in a link layer destination address field;

in response to the arrival of the packet at the MR, checking the mapping table using the LLA_MRi in the link layer destination address field to obtain the associated CoA;

checking the first neighbor cache using the CoA obtained from the mapping table to obtain the associated LLA of the MNN; and

transmitting the packet to the MNN using the obtained LLA in the link layer destination address field.

5. A method to manage addresses in a network, comprising:

when connecting a mobile router (MR) of a mobile network (MONET) to an access point (AP) of an access network (AN) that includes an Access Router (AR), sending a first neighbor advertisement from a mobile network node (MNN), the first neighbor advertisement comprising a care of address (CoA) and a link layer address (LLA) of the MNN within the MONET;

based on the first neighbor advertisement, constructing a mapping table in the MR that associates the LLA of the MNN with one of a set of LLAs of the MR (LLA_MRi);

sending a second neighbor advertisement from the MR to the AN on behalf of the MNN, the second neighbor advertisement comprising a mapping between the CoA of the MNN and the LLA_MRi; and

based on the second neighbor advertisement, constructing a neighbor cache in the AR that associates the CoA with the LLA_MRi.

6. A method as in claim 5, further comprising:

in response to an arrival of a downlink packet at the AR having a CoA in a destination address field, checking the neighbor cache using the CoA to obtain the associated LLA_MRi of the MR;

transmitting the packet to the MR using the LLA_MRi in a link layer destination address field;

in response to the arrival of the packet at the MR, checking the mapping table using the LLA_MRi in the link layer destination address field to obtain the associated LLA of the MNN; and

transmitting the packet to the MNN using the obtained LLA in the link layer destination address field.

7. A system to manage addresses in a network, comprising a mobile network (MONET) having a mobile router (MR) and at least one Mobile Network Node (MNN), said Monet being connectable via the MR to an access point (AP) of an access network (AN) that comprises an Access Router (AR), said system comprising data processors that operate in accordance with stored programs, where a data processor of the MNN is responsive to the MR connecting to the AP to send a first neighbor advertisement that comprises a care of address (CoA) and a link layer address (LLA) of the MNN within the MONET; where a data processor of the MR, responsive to the first neighbor advertisement, constructs a first neighbor cache that associates the CoA with the LLA and sends a second neighbor advertisement from the MR to the AN on behalf of the MNN, the second neighbor advertisement comprising a mapping between the CoA of the MNN and a LLA of the MR (LLA_MR); and where a data processor of the AR, responsive to the second neighbor advertisement, constructs a second neighbor cache that associates the CoA with the LLA_MR.

8. A system as in claim 7, where said AR data processor is further responsive to an arrival of a downlink packet at the AR having a CoA in a destination address field to check the second neighbor cache using the CoA to obtain the associated LLA_MR of the MR and

to transmit the packet to the MR using the LLA_MR in a link layer destination address field; where said MR data processor is further responsive to the arrival of the packet at the MR to check the first neighbor cache using the CoA in an IP layer destination address field to obtain the associated LLA of the MNN to transmit the packet to the MNN using the obtained LLA in the link layer destination address field.

9. A system as in claim 7, where said MR comprises a wireless device.

10. A system to manage addresses in a network, comprising a mobile network (MONET) having a mobile router (MR) and at least one Mobile Network Node (MNN), said Monet being connectable via the MR to an access point (AP) of an access network (AN) that comprises an Access Router (AR), said system comprising data processors that operate in accordance with stored programs, where a data processor of the MNN is responsive to the MR connecting to the AP to send a first neighbor advertisement that comprises a care of address (CoA) and a link layer address (LLA) of the MNN within the MONET; where a data processor of the MR, responsive to the first neighbor advertisement, constructs a first neighbor cache that associates the CoA with the LLA and constructs a mapping table that associates the CoA with one of a set of LLAs of the MR (LLA_MRi) and sends a second neighbor advertisement from the MR to the AN on behalf of the MNN, the second neighbor advertisement comprising a mapping between the CoA of the MNN and the LLA_MRi; and where a data processor of the AR, responsive to the second neighbor advertisement, constructs a second neighbor cache that associates the CoA with the LLA_MRi.

11. A system as in claim 10, where said AR data processor is further responsive to an arrival of a downlink packet at the AR having a CoA in a destination address field to check the second neighbor cache using the CoA to obtain the associated LLA_MRi of the MR and to transmit the packet to the MR using the LLA_MRi in a link layer destination address field; where said MR data processor is further responsive to the arrival of the packet at the MR to check the mapping table using the LLA_MRi in the link layer destination address field to obtain the associated CoA, to check the first neighbor cache using the CoA obtained from the mapping table to obtain the associated LLA of the MNN

and to transmit the packet to the MNN using the obtained LLA in the link layer destination address field.

12. A system as in claim 10, where said MR comprises a wireless device.

13. A system to manage addresses in a network, comprising a mobile network (MONET) having a mobile router (MR) and at least one Mobile Network Node (MNN), said Monet being connectable via the MR to an access point (AP) of an access network (AN) that comprises an Access Router (AR), said system comprising data processors that operate in accordance with stored programs, where a data processor of the MNN is responsive to the MR connecting to the AP to send a first neighbor advertisement that comprises a care of address (CoA) and a link layer address (LLA) of the MNN within the MONET; where a data processor of the MR, responsive to the first neighbor advertisement, constructs a mapping table that associates the LLA of the MNN with one of a set of LLAs of the MR (LLA_MRi) and sends a second neighbor advertisement from the MR to the AN on behalf of the MNN, the second neighbor advertisement comprising a mapping between the CoA of the MNN and the LLA_MRi; and where a data processor of the AR, responsive to the second neighbor advertisement, constructs a neighbor cache that associates the CoA with the LLA_MRi.

14. A system as in claim 13, where said AR data processor is further responsive to an arrival of a downlink packet at the AR having a CoA in a destination address field to check the neighbor cache using the CoA to obtain the associated LLA_MRi of the MR and to transmit the packet to the MR using the LLA_MRi in a link layer destination address field, where said MR data processor is responsive to the arrival of the packet at the MR to check the mapping table using the LLA_MRi in the link layer destination address field to obtain the associated LLA of the MNN and to transmit the packet to the MNN using the obtained LLA in the destination address field.

15. A system as in claim 13, where said MR comprises a wireless device.